CLAIMS

Sub a7

~~Therefore, having thus described the invention, at least the following is claimed:~~

Sub a4

1. A personal communications device comprising:
a telecommunications unit;
a global positioning systems (GPS) receiver; and
a clock source for providing a clock signal to the global positioning receiver and the telecommunications unit.

2. A personal communications device according to claim 1 wherein the clock source provides a common clock signal to the global positioning receiver and the telecommunications unit.

3. A personal communications device according to claim 1 wherein the telecommunications device comprises a CDMA based telecommunications device.

4. A personal communications device according to claim 3 wherein the telecommunications unit communications comprises the clock source.

Sub a1

5. A personal communications device according to claim 4 wherein the clock source comprises a crystal oscillator.

6. A personal communications device according to claim 4 wherein the GPS receiver comprises a voltage controlled oscillator for generating a system clock signal based upon the clock source, and a feedback loop for controlling the voltage controlled oscillator.

7. A personal communications device according to claim 6 wherein the feedback loop comprises a frequency synthesizer for producing a feedback signal, a phase comparator for generating a control signal in accordance with the feedback signal and the common clock source signal and a loop filter for processing the control signal and outputting it to the voltage controlled oscillator.

8. A personal communications device according to claim 7 wherein the frequency synthesizer comprises:

a controlled oscillator having a variable output controlled by an input signal;

a frequency divider coupled to receive the output of the controlled oscillator and responsive to the output to provide a frequency divided output signal;

a phase compensation circuit coupled to receive the frequency divided output signal from the frequency divider, the phase compensation circuit responsive to the frequency divided output signal to provide an output which compensates for phase lag of the frequency divided output of the frequency divider; and

a phase detector coupled to receive frequency and to output a signal proportional to the difference in phase between the two inputs to control the controlled oscillator.

9. The personal communications device of claim 8 wherein the divider is a fractional-N divider.

10. The personal communications device of claim 8 wherein the controlled oscillator is a voltage controlled oscillator.

11. The personal communications device of claim 8 further comprising a switch for selectably engaging the feedback loop to control the voltage controlled oscillator.

12. The personal communications device of claim 11 wherein the switch is permanently set during manufacture.

13. A method of clocking GPS receiver operations comprising the steps of:

receiving a clock signal from a clock source;

generating a control voltage for controlling the frequency of an oscillator signal generated by a voltage controlled oscillator based upon a feedback signal from a frequency synthesizer; and

generating a system clock signal of a particular frequency in response to the control voltage.

14. A method of clocking GPS receiver operations according to claim 13 wherein the clock source comprises a crystal oscillator of a telecommunication unit.

15. A method of clocking GPS receiver operations according to claim 13 wherein the telecommunications unit comprises a CDMA based telecommunications unit.

16. A method of clocking GPS receiver operations according to claim 13 wherein the frequency synthesizer generates the feedback signal in accordance with the following steps:

receiving the system clock signal;

frequency dividing the system clock signal by at least two integer values to generates a fractional-N divider signal over a discreet time period;

generating a variably delayed signal based upon the fractional-N divided signal, wherein the variable delay compensates for phase delays of the fractional-N divided signal within the discreet time period; and

comparing the phase of the variably delayed signal and a reference signal and varying the system clock signal according to the difference.

17. A personal communications device comprising:

means for receiving a telecommunication signal;

means for receiving a global positioning system (GPS) signal; and

means for generating a clock source signal to be provided to the means for receiving a global positioning system (GPS) signal and the means for receiving a telecommunications signal.

18. A personal communications device according to claim 17 wherein the means for receiving a telecommunications signal comprises a code division multiple access (CDMA) based radio frequency receiver.

19. A personal communications device according to claim 17 wherein the means for receiving a GPS signal comprises an oscillator for generating a GPS system clock signal and a feedback loop for generating and providing a control signal to the oscillator.

20. A personal communications device according to claim 19 wherein the feedback loop comprises a frequency synthesizer for generating a feedback signal, a phase comparator for generating a control signal in accordance with the feedback signal and the common clock signal.

21. A personal communications device according to claim 19 wherein the means for generating a clock source signal comprises a crystal oscillator within the means for receiving a telecommunications signal.

22. A personal communications device comprising:

a telecommunications unit;

a global positioning systems (GPS) receiver comprising a first antenna for receiving GPS signals; a downconverter coupled to the first antenna, the first antenna providing the GPS signals to the downconverter; a local oscillator coupled to the downconverter, the local oscillator providing a first reference signal to the downconverter to convert the GPS signals from a first frequency to a second frequency; a second antenna for receiving a precision carrier frequency signal from a source providing the precision carrier frequency signal; an automatic frequency control (AFC) circuit coupled to the second antenna, the AFC circuit providing a second reference signal to the local oscillator to calibrate the first reference signal of the local oscillator, wherein the local oscillator is used to acquire the GPS signals; and

the local oscillator signal is provided to the global positioning receiver and the telecommunications unit.

23. A personal communications device comprising:

a telecommunications unit;

a global positioning systems (GPS) receiver comprising a first antenna for receiving GPS signals; a downconverter coupled to the first antenna, the first antenna providing the GPS signals to the downconverter, the downconverter having an input for receiving a local oscillator signal to convert the GPS signals from a first frequency to a second frequency; a second antenna for receiving a precision carrier frequency signal from a source providing the precision carrier frequency signal; an automatic frequency control (AFC) circuit being coupled to the second antenna, the AFC circuit being coupled to the downconverter to provide the local oscillator signal which is used to acquire the GPS signals; and

the local oscillator signal is provided to the global positioning receiver and the telecommunications unit.

24. personal communications device comprising:

a telecommunications unit;

a GPS receiver comprising a GPS antenna for receiving data representative of GPS signals from at least one satellite; a digital processor coupled to the GPS antenna, the digital processor processing the data representative of GPS signals from at least one satellite, including performing a matched filtering operation to determine a pseudorange based on the data representative of GPS signals, the digital processor also processing communication signals received through a communication link, the processing of communication signals comprising demodulation of communication signals sent to the GPS receiver; and

a clock source for providing a clock signal to the GPS receiver and the telecommunications unit.

25. A personal communications device comprising:

a telecommunications unit;

a GPS receiver comprising a frequency tolerant wireless transceiver to receive and transmit on the wireless signal energy on the same frequency and to automatically adjust to that frequency, wherein the transceiver comprises: an antenna to receive a wireless data signal, including application data from one or more remote transceivers, at an actual frequency and issue this signal as a conducted radio frequency (RF) data signal and to transmit a wireless return signal at the actual frequency to the remote transceiver in response to a conducted RF return signal; a synthesizer to generate a local oscillator (LO) signal sequentially in response to a first and a second frequency control signal, and to generate the RF return signal at the actual frequency in response to the second frequency control signal and having modulation in response to a digital return signal; a direct conversion receiver to receive the LO signal to down convert the RF data signal to a baseband data signal; a frequency discriminator to receive the baseband data signal, to provide a frequency difference signal for the current frequency difference between the expected frequency and the actual frequency, and to demodulate the baseband data signal, and to issue a demodulated data signal; a microcontroller system having a receive adjust mode to provide the first frequency control signal predictive of an expected frequency and to receive the frequency difference signal, having a receive data mode to process the frequency difference signal, to provide the second frequency control signal predictive of the actual frequency, and to receive the demodulated data signal, including the application data, and to provide the digital return signal; and

the local oscillator signal is provided to the global positioning receiver and the telecommunications unit.

26. A personal communications device comprising:

a telecommunications unit;

a GPS receiver comprising a frequency tolerant transceiver to automatically adjust to receive a radio frequency (RF) data signal on an actual frequency and to transmit an RF return signal on that same frequency, wherein the transceiver comprises: a synthesizer for sequentially generating a local oscillator (LO) signal and the RF return signal, the LO signal sequentially having a first frequency corresponding to an expected frequency of the RF data signal and a second frequency corresponding to the actual frequency of the RF data signal in resp9onse to a first and a second frequency control signal, respectively, the RF return signal having the second frequency in response to the second frequency control signal;

a microcontroller system having a receive adjust mode for providing the first frequency control signal predictive of the expected frequency and providing the second frequency control signal for the actual frequency based upon a frequency difference between the actual frequency and the expected frequency; and

the local oscillator signal is provided to the global positioning receiver and the telecommunications unit.